



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SYNOPSIS OF THE CHINESE SPECIES OF PYRUS.

By ALFRED REHDER.

Presented, January 13, 1915.

Received, January 19, 1915.

At the Arnold Arboretum there have been growing under the name of *Pyrus sinensis* several quite distinct trees which always have been a puzzle as regards their taxonomic standing. In working up the *Pyrus* of the Wilson collection I took the opportunity to essay a determination of all the Chinese *Pyrus* represented in the herbarium and grounds of the Arnold Arboretum. The first task, of course, was to decide which of the different forms represents the true *Pyrus sinensis* of Lindley. Professor Sargent, who had always taken much interest in the Chinese pear question, looked up Lindley's type in the Botanical Museum at Cambridge during his visit to England last summer and came to the conclusion that it does not agree with any of the forms now cultivated as *Pyrus sinensis*. He brought back an excellent photograph of the type specimen, which, together with Lindley's description and figure in the Botanical Register, convinced me, too, that *P. sinensis* of Lindley is quite different from the *P. sinensis* of subsequent authors, which is in most cases an aggregate of several species. To one of them belong the forms introduced some forty years ago from Japan into this country as Japanese or Chinese sand pears and which have given rise by crossing with the common pear to the Kieffer and similar forms. These Japanese pears are probably garden forms derived from a Chinese type or partly hybrids and, though differing in the fruit, are remarkably alike in foliage, as shown by an extensive collection from the Garden Herbarium of the Cornell University Experiment Station, kindly loaned by Professor L. H. Bailey. Two apparently wild forms, introduced from northern China, have been cultivated at the Arnold Arboretum since 1882, together with a third form of unknown native habitat received from Kew as *P. Simonii* which I have seen in France cultivated as *P. sinensis*. Two other forms have been introduced by Wilson from western China. Recently the Department of Agriculture has introduced a number of Chinese cultivated pears which exhibit a great variety in the size, shape, color and quality of the fruits, and, to a lesser degree, also in foliage. We are obliged to the Department for a series of photographs of fruits taken in China and of specimens of leaves from grafts

growing at Chico, Cal. Little, however, can be said at present about the affinity of these pears, as the material is too insufficient; the leaves are apparently from the tips of young shoots and do not show the characteristic form of normal leaves, and most of the photographs fail to exhibit the important character of the persistent or deciduous calyx. We shall have to wait until these plants flower and fruit before we can attempt their classification.

The following Conspectus includes all the species hitherto known from China proper. Several of these species occur also outside of the limits of China; *Pyrus ussuriensis* ranges into Amurland, *P. Calleryana* into Korea and Central Japan, *P. Koehnei* into Formosa and *P. pashia* into the Himalayas. Besides these there occur in central and eastern Asia three species which are not found in China, though closely related to Chinese species; these are *P. Fauriei* Schneider in Korea, *P. Uyematsuana* Makino in central Japan, and *P. Jaque-montiana* Decaisne in the western Himalayas. All these are mentioned and briefly characterized in the following Enumeration under the species to which they are most nearly related. Another group of about nine species extends from Turkestan through Persia and Asia Minor into southern and western Europe and into northern Africa, but as none of them seems to be very closely related to any of the Chinese species, they do not concern us here. There is no true *Pyrus* in the southern hemisphere nor on the American continent.

CONSPECTUS SPECIERUM SINENSII.

Calyx persistens.

Folia argute setoso-serrata.

Pomum breviter pedicellatum, subglobosum: folia orbiculari-ovata vel ovata, ut inflorescentia ab initio glabra.

1. *P. ussuriensis*.

Pomum longe pedicellatum, ovatum; folia oblongo-ovata v. ovata ut inflorescentia ab initio plus minusve floccoso-tomentosa.....2. *P. ovoidea*.

Folia denticulata v. dentata dentibus non setoso-acuminatis: pomum longe pedicellatum, ovale.....3. *P. Lindleyi*.

Calyx deciduus.

Folia setoso-serrata.

Basis foliorum late cuneata: pomum flavum.

4. *P. Bretschneideri*.

Basis foliorum subcordata vel rotundata: pomum fuscum.

5. *P. serotina*.

Folia argute serrulata v. dentato-serrata dentibus non setoso-acuminatis.

Styli 3-4: pomum 1.5-2 cm. diam.: folia basi plerumque rotundata.

Folia argute serrulata dentibus acutis vel acuminatis subacumbentibus.....6. *P. serrulata*.

Folia dentato-serrata dentibus erecto-patentibus.

7. *P. phaeocarpa*.

Styli 2: pomum circiter 1 cm. diam.: folia grosse dentato-serrata, basi plerumque late cuneata...8. *P. betulaeifolia*.

Folia crenata vel crenato-serrata.

Stamina circiter 20: folia et inflorescentia ab initio glabra.

Styli 2: folia ovata, basi plerumque rotundata.

9. *P. Calleryana*.

Styli 3-5.

Folia late ovata, crenato-dentata, basi subcordata.

10. *P. kolupana*.

Folia ovata, crenato-serrata, basi late cuneata vel rotundata.

11. *P. Koehnei*.

Stamina 25-30: folia ovata v. oblonga, crenato-serrata, basi plerumque rotundata, ut inflorescentia tomentosa vel fere glabra: styli 3-5.....12. *P. pashia*.

ENUMERATIO SPECIERUM.

1. ***Pyrus ussuriensis*** Maximowicz in *Bull. Acad. Sci. St. Pétersb.* XV. 132 (1857); in *Mém. Sav. Étr. Acad. Sci. St. Pétersb.* IX. 102 (*Prim. Fl. Amur.*) (1859).—Regel in *Gartenfl.* X. 374, t. 345 (1861).—Lauche in *Monatsschr. Ver. Beförd. Gartenb. Preuss.* XXII. 318, t. 4 (1879), pro parte, quoad flores.

Pyrus communis Bunge in *Mém. Sav. Étr. Acad. Sci. St. Pétersb.* II. 101 (*Enum. Pl. Chin. Bor.* 27) (1833), pro parte, non Linnaeus.

Pyrus sinensis Decaisne, *Jard. Fruit.* I. t. 5 (1872), non Poiret, nec Lindley.—Maximowicz in *Bull. Acad. Sci. St. Pétersb.* XIX 172 (1873); in *Mél. Biol.* IX. 168 (1873), pro parte.—Komarov in *Act. Hort. Petrop.* XXII. 476 (*Fl. Manshur.*) (1904), pro parte.—Schneider, *Ill. Handb. Laubholz.* I. 663, fig. 361 q (1906), pro parte, quoad folia.

Pyrus Simonii Carrière in *Rev. Hort.* 1872, 28, fig. 3.

Pirus sinensis a. *ussuriensis* Makino in *Tokyo Bot. Mag.* XXII. 69 (1908).

Pirus sinensis a. *silvestris* Makino msc. ex Makino, l. c., quasi synonym.

CHILI: "China bor.," ex herb. Bunge (Gray Herb.); Hsiao Wutai-shan, August 20, 1913, *F. N. Meyer* (No. 1232). AMURLAND: "montes Burejae," 1859, *Maximowicz* (Gray Herb.); "Amur medius," May 18, 1891, *S. Korshinsky*. USSURI: without precise locality, *Maximowicz* (Gray Herb.). MANCHURIA: Kabarovsk, cultivated, August 23, 1903, *C. S. Sargent*.

This species differs from the allied species chiefly in the short stalk of the globose fruit with persistent calyx, in the broad, often nearly orbicular, strongly setosely serrate leaves and in the lighter yellowish brown color of the branches; the flower clusters are, owing to the short stalks rather dense and hemispherical; the petals are obovate and rather gradually narrowed toward the base; the styles are distinctly pilose near the base.

Pyrus ussuriensis was first introduced into cultivation by Richard Maack who sent seeds to the Botanic Garden at St. Petersburg, but the tree is still rare in gardens.

2. *Pyrus ovoides* Rehder, sp. n.

?*Pyrus chinensis* Roxburgh, *Hort. Bengal.* 38 (1814), nomen nudum, non *Pyrus sinensis* Poiret; *Fl. Ind.* ed. 2, II. 511 (1832).

Pyrus sinensis Hemsley in *Jour. Linn. Soc.* XXIII. 257 (1887), pro parte, non Poiret, nec Lindley.—Diels in *Bot. Jahrb.* XXIX. 38 (1900), pro parte.—Schneider, *Ill. Handb. Laubholz.* I. 663, fig. 364 c-d (1906), pro parte.

Pyrus Simonii Hort., non Carrière.

Arbor pyramidalis, 10–15-metralis, inermis; ramuli hornotini maturi purpureo-fusci v. flavo-fusci, nitiduli, vetustiores castanei, lenticellis parvis paucis conspersi; gemmae conico-ovoideae, castaneae, glabrae. Folia ovato-oblonga, rarius ovata, acuminata, basi rotundata v. subcordata, argute setoso-serrata dentibus erecti-patentibus v. interdum accumbentibus, 7–12 cm. longa et 4–6.5 cm. lata, initio ad marginem tantum et subtus ad costam tomento floccoso fulvo cito evanescente praedita, mox glaberrima, supra luteo-viridia, lucida, subtus paullo pallidiora, maturitate chartacea et autumnis colore pulchro purpureo-scarlatino et aurantiaco gaudentia, utrinsecus nervis 9–10 supra et subtus leviter elevatis; petioli graciles, 2.5–5 cm. longi, initio sparse floccoso-lanati, mox glaberrimi. Flores circiter 3 cm. diam., in racemis umbelliformibus 5–7-floris glabris v. interdum tomento floccoso cito evanescente vestitis; pedicelli 2.5–4 cm. longi;

calyx ut receptaculum extus glaber; sepala e basi late triangulari-lanceolata, denticulata, intus ad basin dense lanata; petala late obovata v. late ovalia, circiter 12 mm. longa, basi subito brevissime unguiculata, glabra, alba; stamina circiter 20, dimidiam partem petalorum vix aequantia, antheris purpureis; styli 5, distincti, basi pilosi, staminibus longioribus paullo breviores. Pomum ovoideum, basi rotundatum impressum, apicem versus attenuatum calyce persistente erecto vel incurvo coronatum, pedunculo gracili 2–4 cm. longo insidens, flavum, punctatum, circiter 4–4.5 cm. longum et 3.5–4 cm. diam., sapore grato leviter adstringente; semina ovoideo-oblonga, compressa, 9–10 mm. longa et 6 mm. lata, castanea, nitida.

Cultivated in the Arnold Arboretum under No. 4033 (received from Kew as *P. Simoni*), May 7 and 13, 1909, April 30, 1910, May 14, 1914, October 19, 1908, October 16, 1912 (type); Hort. Simon-Louis, Plantières near Metz, August 24, 1911, *A. Rehder* (as *P. sinensis*). Probably also the following specimens belong to this species: FOKIEN: *Dunn's* Exped. to Central Fokien, April to June, 1905 (Hongkong Herb. No. 2595). YUNNAN: Mengtze, cultivated, alt. 1500 m., *A. Henry* (No. 11058).

This species seems to be most closely related to *P. ussuriensis* Maximowicz which differs chiefly in the broader orbicular-ovate or ovate leaves, in the lighter colored branches, and in the short-stalked subglobose fruit with the persistent sepals spreading. The shape of the fruit of *P. ovoidea* is very unusual and quite distinct from any pear I know; the fruit is exactly ovate, broad and rounded at the base and tapering from the middle toward the truncate apex, as figured by Schneider (l. c. fig. 364 d). This may, however, not be a specific character and the shape of the fruit may vary in other specimens referable to this species. The Chinese material which I have seen and which might belong here is very meagre. The Fokien specimen is in young fruit which suggests a more pyriform shape, though tapering toward the apex and showing the same kind of persistent calyx; the serration of the leaves is more minute and more accumbent. The Yunnan specimen is in flower and differs somewhat in the more copious tomentum of the leaves and of the inflorescence and in the shorter nearly entire calyx-lobes.

It is not known when and whence this species was introduced. Possibly it was sent in the early sixties from northern China by G. E. Simon, or by A. David a little later from the same region or from Mongolia to the Museum in Paris and was afterwards distributed by Decaisne.

3. ***Pyrus Lindleyi*** Rehder, nom. n.

Pyrus sinensis Lindley in *Trans. Hort. Soc. London*, VI. 396 (1826), non Poiret; in *Bot. Reg.* XV. t. 1248 (1829).

Lindley's *Pyrus sinensis* seems to have been much misunderstood, and the name has been applied to all Chinese pears characterized by setosely serrate leaves. Lindley's description, however, as well as his type specimen, of which I have a good photograph before me, show that the leaves of his species have short, rather small and not at all acuminate teeth. He certainly would have mentioned such a striking character as the setose teeth in his description, but in the description he simply says "foliis . . . serratis" and in his comparison with *Pyrus communis* he does not mention the serration at all, which tends to show that he did not perceive much difference between the serration of *Pyrus communis* and that of his new species. The true *P. sinensis* of Lindley seems to have been lost to cultivation in Europe and in this country, for all the plants and specimens I have seen belong to species with setosely serrate leaves, and *Pyrus Lindleyi* rests at present only on Lindley's description and his type specimen.

In the *P. sinensis* of most authors three species seem to have been included, two of them with persistent calyx and one with deciduous calyx. In *P. Lindleyi* the calyx is persistent according to Lindley's description in the Botanical Register and according to the description, probably by the secretary of the society, in the Transactions of the Horticultural Society where only the fruit is fully described and nothing said about the leaves and the tree itself, with a note that "it has been named by Mr. Lindley *Pyrus sinensis*."

In Lindley's type specimen the leaves of the shoots are ovate, abruptly acuminate and rounded at the base, and those of the short branchlets mostly subcordate; all are closely serrate, with small appressed, acute teeth, or those of the short branchlets nearly crenately serrate. As much as can be judged from the photograph they appear to be quite glabrous and about 8 or 10 cm. long.

Pyrus Lindleyi is possibly not a wild species, but a cultivated form. At present, however, with our incomplete knowledge of the Chinese pears, it seems best to treat it as a species. *Pyrus communis* Loureiro (*Fl. Cochín.* 321. 1790) may belong here as a synonym, as the author describes the leaves as "subintegerrima."

The name *Pyrus sinensis* of Lindley cannot be maintained for this species on account of the older *P. sinensis* (Thouin) Poiret (*Encycl. Méth. Suppl.* IV. 452. 1816). Even though the latter species is now

generally referred to *Chaenomeles*, it must be considered nomenclatorially a valid name and the combination cannot be used again for another species.

4. ***Pyrus Bretschneideri*** Rehder, sp. n.

Arbor mediocris; ramuli hornotini sparsissime lanuginosi, cito glabri, annotini fusco-purpurei, sparse lenticellati; gemmae ovatae, 4–5 mm. longae, perulis late ovatis manifeste mucronulatis castaneis extus margine villosulo excepto glabris. Folia subchartacea, ovata vel elliptico-ovata, acuminata, basi late cuneata, rarissime fere rotundata, argute serrata dentibus initio setoso-acuminatis, demum manifeste acuminatis plerumque leviter accumbentibus, 5–11 cm. longa et 3.5–6 cm. lata, initio utrinque laxo araneoso-lanuginosa, cito glabra, supra saturate luteo-viridia, subtus paullo pallidiora, leviter reticulata; petioli graciles, 2.5–7 cm. longi, initio sparsissime lanuginosi, cito glabri. Inflorescentia umbellato-racemosa, 7–10-flora, rhachi, pedicellis, receptaculis sparse lanuginosis, mox glabris; pedicelli 1.5–3 cm. longi, bracteolis 2 subulatis circiter 5 mm. longis instructi; sepala e basi late triangulari acuminata, circiter 4 mm. longa, glanduloso-serrata, extus glabra, intus fulvo-lanuginosa; petala ovalia, apice plerumque irregulariter erosa, basi breviter unguiculata, 12–14 mm. longa et 10–12 mm. lata, alba; stamina circiter 20, petala dimidia aequantia; styli 5 vel interdum 4, stamina subaequant, glabri. Pomum subglobosum vel globoso-ovoideum, 2.5–3 cm. longum et circiter 2.5 cm. diam., apice cicatrice impressa calycis decidui notatum, basi subito in pedicellum 3–4 cm. longum contractum, pendens, flavum, pallide et minute punctulatum, 5- vel rarius 4-loculare; semina obovoidea, leviter compressa, 6–7 mm. longa, castanea.

Arnold Arboretum, cultivated, April 22, 1910 and October, 1908 (type, raised from seed sent by Dr. E. Bretschneider from Peking in 1882).

This species seems nearest to *P. ovoidea* Rehder which is easily distinguished by the persistent calyx and by the more oblong-ovate leaves rounded or even subcordate at the base. In its deciduous calyx it agrees with *P. phaeocarpa* Rehder, but this species differs in its smaller 3–4-celled brown fruit and the coarser serration of the more oblong-ovate leaves. *Pyrus Bretschneideri* may be the pear alluded to by Bretschneider (*Hist. Eur. Bot. Discov.* 830) as pai-li (white pear), though this name may also apply to *P. ussuriensis* or to *P. ovoidea*.

5. ***Pyrus serotina*** Rehder, sp. n.

Arbor 7–15-metralis; ramuli hornotini glabri vel initio laxo villosuli, rarius tomento floccoso densius obtecti, mox glabri, annotini et vetu-

stiores purpureo- vel fusco-brunnei, sparse lenticellati; gemmae acutiusculae, ad 1 cm. longae, perulis ovatis acutis margine excepto fere glabris fuscis. Folia subchartacea, ovato-oblonga vel rarius ovata, longe acuminata, basi rotundata, rarius subcordata, interdum late cuneata, arcte et argute serrata dentibus setoso-acuminatis subaccumbentibus, 7-12 cm. longa et 4-6.5 cm. lata, initio margine laxe villosa et subtus secus costam tenuiter araneoso-lanata vel fere glabra, rarius utrinque fere in tota facie tomento araneoso evanescente laxo oblecta, mox glaberrima, supra laete viridia, subtus paullo pallidiora, utrinque in sicco leviter reticulata, utrinsecus nervis 6-11 arcuatis; petioli graciles, 3-4.5 cm. longi, initio fere glabri vel plus minusve floccoso-tomentosi, mox glabri. Inflorescentia umbellato-racemosa, 6-9-flora, fere glabra vel plus minusve tomento floccoso flavesciente vel canescente oblecta; pedicelli graciles, 3.5-5 cm. longi; sepala e basi triangulari-ovata, longe acuminata, 6-10 mm. longa, glanduloso-denticulata, patentia, receptaculum saepe fere duplo superantia, extus fere glabra vel plus minusve tomentosa, intus ad basin saltem fulvo-tomentosa; petala ovalia, 15-17 mm. longa, apice plerumque irregulariter erosa, breviter unguiculata; stamina circiter 20, dimidia petala aequantia; styli 5, rarius 4, glabri, staminibus fere aequilongi. Ponium subglobosum, apice leviter impressum, cicatrice calycis decidui notatum, basi subito in pedicellum gracilem 3.3-5 cm. longum contractum, circiter 3 cm. diam., fuscum, pallide punctulatum; semina cuneato-ovoidea, leviter compressa, basi in stipitem contracta, 8-10 mm. longa, atro-brunnea.

WESTERN HUPEH: Hsing-shan Hsien, woodlands, alt. 1300-2000 m., May and December 1907, *E. H. Wilson* (No. 479a, type); same locality, May and October 1907, *E. H. Wilson* (No. 2977); Patung Hsien, thickets, alt. 1000-1600 m., May 1907, *E. H. Wilson* (No. 556b); north and south of Ichang, thickets, alt. 600-1300 m., April 1907, *E. H. Wilson* (No. 479b); same locality, October 1907, *E. H. Wilson* (No. 415); Changlo Hsien, thickets, May 1907, *E. H. Wilson* (No. 556c); without precise locality, *A. Henry* (No. 5299). EASTERN SZECHUAN: without precise locality, *A. Henry* (No. 5875). WESTERN SZECHUAN: Tachienlu, alt. 2000-2600 m., October 1908, *E. H. Wilson* (No. 1293).

This species seems to be most closely related to *P. Bretschneideri* Rehder which is easily distinguished by the leaves being broadly cuneate at the base, by the smaller flowers and by the yellow color of the fruit. Its leaves resemble closely those of *P. ovoidea* Rehder so that it seems impossible to distinguish these two species with cer-

tainty without flowers or fruits; in fruit, however, the persistent calyx of the ovate yellow fruit of *P. ovoidea* presents a good character, and the flowers of *P. ovoidea* may be distinguished by the styles being pubescent at the base. Wilson's No. 2977, of which the fruit is not known, differs from the type in its broader ovate or broadly ovate leaves with more appressed teeth and may represent a distinct variety or even another species. Henry's No. 5875 has the fruit pyriform and may belong to the following variety. Henry's No. 5299 is in flower only and agrees with this species in its glabrous styles; both specimens of Henry may be from cultivated plants.

This species was introduced by E. H. Wilson in 1909 and seeds were distributed by the Arnold Arboretum. According to a note received two years ago it is growing in the Botanic garden at Glasnevin.

This pear and probably other brown-fruited species are called by the Chinese tang-li.

***Pyrus serotina* var. *Stapfiana* Rehder, n. var.**

Pyrus sinensis Stapf in *Bot. Mag.* CXXXIV. t. 8226 (1908), quoad plantam depictam, non Poiret, nec Lindley.

A typo recedit fructu pyriformi, foliorum dentibus minus adpressis, petalis satis sensim in unguiculum attenuatis.

***Pyrus serotina* var. *culta*, Rehder, comb. n.**

?*Pyrus communis* Thunberg, *Fl. Jap.* 207 (1784), non Linnaeus.

?*Pyrus communis* c. *hiemalis* Siebold in *Verh. Bat. Genoot.* XII. pt. 1, 66 (*Syn. Pl. Oecon. Jap.* No. 349) (1830), nomen nudum.

?*Pyrus communis* β. *sinensis* K. Koch in *Ann. Mus. Lugd.-Bat.* III. 40 (1866).

Pyrus Sieboldi Carrière in *Rev. Hort.* 1880, 110, t., non Regel.

Pyrus sinensis Bailey, *Cycl. Am. Hort.* III. 1470 (1901), pro parte, non Lindley, nec Poiret.

Pyrus japonica Hort. ex Bailey, l. c. quasi synonym., non Thunberg.

Pyrus sinensis β. *culta* Makino in *Tokyo Bot. Mag.* XXII. 69 (1908).—Koidzumi in *Jour. Coll. Sci. Tokyo*, XXXIV. art. 2, 54 (1913).

A typo recedit fructu majore pyriformi vel maliformi, foliis majoribus latioribusque ad 15 cm. longis et ad 8–10 cm. latis.

JAPAN: Arakawa, north of Tokyo, roadside, April 2, 1914, *E. H. Wilson* (No. 6541, bush 2 m.); Hatogaya near Tokyo, cultivated, April 29, 1914, *E. H. Wilson* (No. 6595); Tokyo, Sakurai's garden, April 24, 1912, *K. Sakurai*; slopes of Mt. Fuji, alt. 2600 m., cultivated, May 8, 1914, *E. H. Wilson* (No. 6668; small tree, 12–20

feet); Tsuba-kura-dake, prov. Shinano, alt. 900 m., cultivated, September 15, 1914, *E. H. Wilson* (No. 7497; tree 10 m. tall, fruit russet, flesh white, sweet). Besides these specimens I have seen from the Herbarium of the Cornell University Experiment Station numerous specimens from plants cultivated in this country under the names: Oriental Pear, Japanese Pear, Chinese Sand Pear, Madame von Siebold, Daymio, Mikado, Rikiya and Gold Rust or Golden Russet.

The Japanese pear cultivated under the name "Madame von Siebold" may be considered as representing the type of this variety. It has large subglobose, somewhat depressed fruit with deciduous calyx and is well described and figured by Carrière (in *Rev. Hort.* 1879, 170, t.); by Ottolander in *Flor. & Pomol.* 1877, 100, fig. 2 and in *Nederl. Flora en Pomona* 69, t. 21; by S. Morris in *Am. Gard. n. ser.* XIII. 87 (1892); also the figure in *American Agriculturist*, XXX. 462 (1871) and in *Gard. Chron.* ser. 2, III. 106, fig. 17, 18 (1875) belong probably here. *Pyrus Sieboldi* Carrière (in *Rev. Hort.*, 1880, 110, t.) has large pear-shaped fruit with deciduous calyx, but according to Ottolander (in *Flor. & Pomol.*, 1877, 100, fig. 3) it has a persistent calyx. "Ottolander" has an oblong fruit with deciduous calyx (*Flor. & Pomol.*, 1877, 100, fig. 4; also in *Gard. Chron.* ser. 2, IV. 456, fig. 95. 1875, and ser. 3, XXVIII. 300, fig. 89. 1900). "Gold Rust" has, according to a photograph in the Cornell Garden Herbarium, a subglobose fruit without calyx. "Daymio" has a globose-ovoid yellowish fruit with persistent calyx (*Nederl. Flora en Pomona*, 69, t. 21, fruit at the left). "Mikado" has a broadly pear-shaped yellow fruit without calyx (*Rev. Hort.*, 1878, 310, t.). The last two forms are possibly hybrids. Some of the above named forms have hybridized with the Common Pear; the best known of these hybrids is the "Kieffer Pear" which has finely or nearly crenately serrulate leaves and a pear-shaped fruit with persistent calyx.

6. *Pyrus serrulata*, Rehder, sp. n.

Arbor 7-8-metralis; ramuli hornotini leviter lanati, mox glabri, annotini purpureo-fusci, sparse lenticellati; gemmae ovatae, fuscae, perulis ovatis acutis exterioribus margine ciliato excepto glabris. Folia chartacea, ovata vel ovato-oblonga, subito vel sensim acuminate, basi rotundata vel late cuneata, margine serrulata dentibus adpressis et plerumque leviter incurvis acutis vel breviter acuminatis, 5.5-11 cm. longa et 3.5-6.5 lata, initio subtus tomento araneoso-lanato fugace leviter obtectata, cito glabrata, supra ab initio glabra vel fere glabra, nervis utrinsecus 7-13 arcuatis, utrinque in sicco leviter reticulata; petioli graciles, 3.5-7.5 longi, initio leviter lanati, mox

glabri. Inflorescentia racemoso-umbellata, 6–10-flora, rhachi circiter 1.5 cm. longa satis dense flavo-lanata; pedicelli ut receptaculum laxe lanati, 1.5–2 cm. longi; sepala triangulari-ovata, acuta vel acuminata, sparse glanduloso-denticulata, receptaculum subaequantia, circiter 3 mm. longa, extus sparse, intus dense lanata; petala late ovalia, alba, 10–12 mm. longa, subito breviter unguiculata, leviter et irregulariter erosa; stamina circiter 20, petalis circiter triente breviora; styli 3, rarius 4, stamina subaequantia, basi sparsissime pilosi. Pomum subglobosum vel globoso-obovoideum, 1.5–1.8 cm. longum, apice vix impresso cicatrice calycis decidui notatum, basi subito in petiolum 3–4 cm. longum contractum, fuscum, pallide lenticellatum, 3–4-loculare; semina obovoidea, 7 mm. longa et 4 mm. lata, castanea.

WESTERN HUPEH: Hsing-shan Hsien, thickets, alt. 1300–1600 m., May and December 1907, *E. H. Wilson* (No. 779, type); north and south of Ichang, alt. 600–1300 m., October 1907, *E. H. Wilson* (No. 479).

This species seems to be most closely related to *P. serotina* Rehder which is easily distinguished by the setosely serrate, generally longer leaves, by the larger flowers with usually 5 styles and long-acuminate sepals and by the larger fruit. The Japanese *P. Uyematsuana* Makino¹ seems to be most nearly related to *P. serrulata*; according to the description it differs from it in the often subcordate leaves and in the disk which is described as villose by Koidzumi; styles 3–5.

Pyrus serrulata was introduced by E. H. Wilson and seeds have been distributed through the Arnold Arboretum.

7. *Pyrus phaeocarpa* Rehder, sp. n.

Pyrus ussuriensis Lauche in *Monatschr. Ver. Beförd. Gartenb. Preuss.* XXII. 318, t. 4 (1879), quoad fructus, non Maximowicz.

Arbor mediocris; ramuli hornotini tomentosi, tarde glabrescentes, annotini glabri, purpureo-fusci, sparse lenticellati; gemmae oblongo-conicae, acutiusculae, 6–7 mm. longae, perulis castaneis vel partim griseis glabris vel fere glabris. Folia chartacea, elliptico-ovata vel oblongo-ovata, in acumen longum sensim attenuata, basi plerumque late cuneata, serrata dentibus acuminatis apice initio plus minusve incurvis demum patentibus sinubus apertis saepe fere rectangulis, 6–10 cm. longa et 3.5–5.5 cm. lata, initio laxe araneoso-lanata, mox

¹ *Pyrus Uyematsuana* Makino in *Tokyo Bot. Mag.*, **22**, 68 (1908).—Koidzumi in *Jour. Coll. Sci. Tokyo*, XXXIV., art. 2, 56 (1913).

JAPAN: Prov. Ise (ex Makino and Koidzumi).

glaberrima, supra saturate luteo-viridia, subtus pallidiora, nervis utrinsecus 7-10 arcuatis, in sicco utrinque leviter reticulata; petioli initio albido-lanati, rarius fere glabri, mox omnino glabri, graciles, 2-6 cm. longi. Inflorescentia umbellato-racemosa, 5-7-flora, albido-lanata, raro fere glabra; pedicelli 2-2.5 cm. longi, ut receptaculum initio plus minusve lanati, rarius fere glabri, mox omnino glabri; sepala triangulari-lanceolata, acuminata, glandulosa-serrata, receptaculo paullo longiora, 4-5 mm. longa, extus sparse, intus densius lanata; petala ovalia, breviter unguiculata, 1-1.5 cm. longa et 0.8-1.2 cm. lata, glabra, alba; stamina circiter 20, dimidia petala subaequantia; styli glabri, 3-4, rarissime 2. Pomum pyriforme, 2-2.5 cm. longum et 1.5-2 cm. diam., graciliter pedicellatum pedicello 2-3 cm. longo, fuscum, pallide lenticellatum, 3-4-loculare, rarissime 2-loculare; semina obovoidea, compressa, circiter 7 mm. longa, fusco-castanea.

Arnold Arboretum, cultivated, May 12, 1909, and October 1908 (type, raised from seed sent by Dr. E. Bretschneider from Peking in 1882).

This species is most closely related to *P. betulaefolia* Bunge which is easily distinguished by its much smaller 2-celled fruit, the smaller flowers, the smaller and more coarsely serrate leaves and the denser grayish tomentum persisting on the branchlets, on the inflorescence and often on the under side of the leaves particularly on the midrib until autumn. In the shape of its leaves it has some resemblance to *P. Bretschneideri* Rehder, but that species has setosely serrate, generally larger and broader leaves and larger yellow subglobose fruit.

Pyrus phaeocarpa was apparently first introduced in its pear-shaped form to the Horticultural School at Potsdam, Germany, about 1870. At the Arnold Arboretum both the pear-shaped and the apple-shaped forms were raised from seed sent by Dr. Bretschneider from Peking in 1882.

***Pyrus phaeocarpa* f. *globosa* Rehder, forma n.**

A typo recedit fructu globoso, 1.5-2. cm. diam. et foliis paullo latioribus, saepius ovatis et basi rotundatis.

8. ***Pyrus betulaefolia*** Bunge in *Mém. Sav. Étr. Acad. Sci. St. Pétersb.* II. 101 (*Enum. Pl. Chin. Bor.* 27) (1833).—Walpers, *Rep.* II. 53 (1843).—Decaisne, *Jard. Fruit.* I. t. 20 (1872).—Maximowicz in *Bull. Acad. Sci. St. Pétersb.* XIX. 172 (1873); in *Mél. Biol.* IX. 169 (1873).—Debeaux in *Act. Soc. Linn. Cherbourg*, XXXI. 156 (*Fl. Tchéfou*, 61) (1876).—Carrière in *Rev. Hort.* 1879, 318, fig. 68, 69.—Hemsley in *Jour. Linn. Soc.* XXIII. 256 (1887).—Sargent in *Gard. &*

For. VII. 224, fig. 39 (1894).—Diels in *Bot. Jahrb.* XXIX. 387 (1900).—Schneider, *Ill. Handb. Laubholz.* I. 665, fig. 363 o, 364 k-p (1906).—Pampanini in *Nuov. Giorn. Bot. Ital.* n. ser. XVII. 291 (1910).

CHILI: near Peking, *E. Bretschneider*, 1881 (seeds). SHANTUNG: Lau-shan, August 1907, *F. N. Meyer* (No. 308); without precise locality, September 1907, *F. N. Meyer* (No. 398). SHENSI: Yen-an Fu, 1910, *W. Purdom* (No. 328); Poa ting Fu plain, 1909, *W. Purdom*. HUPEH: without precise locality, *A. Henry* (No. 1654).

Henry's specimen from Hupeh differs from the type in its broader and somewhat larger leaves.

This species was first introduced in the sixties by G. E. Simon to the Museum at Paris unintentionally as stock of a grafted Chinese pear. In 1882 it was introduced again to the Arnold Arboretum by Dr. Bretschneider from the mountains near Peking.

This pear is called by the Chinese t'ao-li (pea-pear).

9. *Pyrus Calleryana* Decaisne, *Jard. Fruit.* I. in textu ad t. 8 (1872).—Maximowicz in *Bull. Acad. Sci. St. Pétersb.* XIX. 172 (1873); in *Mél. Biol.* IX. 169 (1873); in *Bull. Soc. Nat. Mosc.* LIV, pt. 1, 18 (1879).—Hance in *Jour. Bot.* XXI. 298 (1883).—Franchet in *Nouv. Arch. Mus. Paris*, ser. 2, V. 272 (1883).—Schneider, *Ill. Handb. Laubholz.* I. 666, fig. 363 p (1906).—Koidzumi in *Jour. Coll. Sci. Tokyo*, XXXIV. art. 2, 55 (1913).

WESTERN HUPEH: Hsing-shan Hsien, thickets, not common, alt. 1000–13000 m. May 14, 1907, *E. H. Wilson* (No. 2775); Changlo Hsien, thickets, alt. 1000–1500 m., December 1907, *E. H. Wilson* (No. 556); Patung Hsien, alt. 1000–1700 m., December 1907, *E. H. Wilson* (No. 556a); around Ichang, common, alt. 1000–1300, March and July 1907, *E. H. Wilson* (No. 2976); mountains north and south of Ichang, alt. 600–1500 m., April 1907, *E. H. Wilson* (No. 415a). KIANGSI: Kuling, side of streams, common, alt. 1300 m., July 29, 1907, *E. H. Wilson* (No. 1662). CHEKIANG: Ningpo, 1908, *D. Macgregor*. KWANGTUNG: without precise locality, *C. Ford* (No. 68); Botanic Garden, Hongkong, Nov. 4, 1903, *C. S. Sargent*.

Pyrus Calleryana is a widely distributed species and seems not uncommon on mountains at an altitude of from 1000 to 1500 m. It is easily recognizable by its comparatively small crenate leaves, like the inflorescence glabrous or nearly glabrous and by its small flowers with 2, rarely 3 styles. When unfolding most specimens show a loose and thin tomentum on the under side of the leaves which usually soon disappears, but in No. 1662 from Kuling even the fully grown leaves are loosely rusty tomentose on the midrib

beneath. In No. 415a the leaves are longer, generally ovate-oblong, the pedicels very long and slender, about 3–4 cm. long and the sepals are mostly long-acuminate. The fruit of No. 556a is rather large, about 1–1.4 cm. in diameter, but a fruit examined proved to be 2-celled.²

This species was introduced by E. H. Wilson to the Arnold Arboretum in 1908 and the young plants seem to be hardy here.

The following Japanese pear is referred by Koidzumi as a variety to *P. Calleryana*.

Pyrus Calleryana* var. *dimorphophylla Koidzumi in *Jour. Coll. Sci. Tokyo*, XXXIV. art. 2, 56 (1913).

Pyrus Calleryana Maximowicz in *Bull. Acad. Sci. St. Pétersb.* XIX. 172 (1873); in *Mél. Biol.* IX. 169 (1873), quoad plantam japonicam.

Pyrus dimorphophylla Makino in *Tokyo Bot. Mag.* XXII. 65 (1908).

JAPAN: Prov. Ise and prov. Shinano (ex Makino and Koidzumi).²

10. ***Pyrus kolupana*** Schneider, *Ill. Handb. Laubholz.* I. 665 (1906); in Fedde, *Rep. Nov. Spec.* III, 120 (1807).

SHENSI: Ko-lu-pa, *G. Giraldu* (Nos. 1050, 5105, ex Schneider).

This species is little known and not yet in cultivation.

11. ***Pyrus Koehnei***, Schneider, *Ill. Handb. Laubholz.* I. 665, fig. 363 m, 364 t–u (1906); in Fedde, *Rep. Nov. Spec.* III. 119 (1907).—Koidzumi in *Jour. Coll. Sci. Tokyo*, XXXIV. art. 2, 57 (1913).

Pyrus Kawakamii Hayata in *Jour. Coll. Sci. Tokyo*, XXX. art. 1, 99 (1911).

CHEKIANG: Tien-tai mountains, alt. 1000 m., *E. Faber* (ex Schneider). FORMOSA: Nanto, *T. Kawakami* (ex Hayata).

This species like the preceding is as yet little known and is not in cultivation. As I have seen neither a specimen from the type locality nor from Formosa, I do not know whether Koidzumi is right in referring *P. Kawakamii* as a synonym to *P. Koehnei*.

12. ***Pyrus pashia*** Hamilton apud Don, *Prodr. Fl. Nepal.* 236 (1825).—G. Don, *Gen. Syst.* II. 622 (1832).—Decaisne, *Jard. Fruit.*

² A closely related species, *P. Fauriei* Schneider (*Ill. Handb. Laubholz.* I. 666, fig. 363 d. 1906) occurs in Korea; it differs chiefly in its much smaller leaves and fruits.

I. 328, t. 7 (1872).—Wenzig in *Linnaea*, XXXVIII. 48 (1874).—Brandis, *Forest Fl. Brit. Ind.* 204 (1874); *Ind. Trees*, 291 (1906).—Kurz, *Forest Fl. Brit. Burma*, I. 441 (1877).—Hooker f., *Fl. Brit. Ind.* II. 374 (1879).—Collett, *Fl. Siml.* 169, fig. 47 (1902).—Schneider, *Ill. Handb. Laubholz.* I. 664, fig. 363 h, 364 e–g (1906).

Pyrus variolosa Wallich, Cat. No. 680 (1828), nomen nudum.—G. Don, *Gen. Syst.* II. 622 (1832).

Pyrus verruculosa Bertoloni in *Mem. Accad. Sci. Bologna*, ser. 2, IV. 312 (*Piante As. II.*) (1864).³

Pyrus heterophylla Hort. ex Decaisne, *Jard. Fruit* I. 328, sub t. 7 (1872), quasi synonym.

Pyrus nepalensis Herb. Hamilt. et Hort. ex Hooker, *Fl. Brit. Ind.* II, 374 (1879), quasi synonym.

WESTERN SZECHUAN: Ching-chi Hsien, alt. 1500 m., October 1908, E. H. Wilson (No. 1335); same locality, open country, alt. 2600 m., October 1910, E. H. Wilson (No. 4132). YUNNAN: Mengtze, alt. 1400–1500 m., A. Henry (Nos. 10035, 10035 c). HIMALAYAS: Kashmir to Bhutan, Kashia Mountains, Ava (ex Hooker f.).

This species is not mentioned by Hemsley in his *Index florae sinensis*, though Hooker in 1879 includes Yunnan in the distribution of the species. Wilson's No. 1335 which is in ripe fruit agrees well with typical *P. pashia* and the young plants raised at the Arnold Arboretum from seeds of that number show exactly the kind of finely and sharply serrate mostly deeply lobed leaves, figured by Decaisne as the form occurring on suckers. No. 4132 differs in its much shorter and tomentose pedicels, only about 1.5 cm. long, and in the generally broader leaves mostly subcordate at the base; part of the fruits show a persistent calyx. Whether this is a variety of this species or a distinct species may be decided when the plants in cultivation flower and fruit.

Pyrus pashia was first introduced in 1825 into England from Nepal or Kumaon; in 1908 it was reintroduced by E. H. Wilson from western China and distributed through the Arnold Arboretum. Possibly the plant introduced in 1825 represents the following variety, as it is this variety which is now found occasionally in European collections.

***Pyrus pashia* var. *kumaoni* Stapf** in *Bot. Mag.* CXXXV. t. 8256 (1909).

³ In the text the references to the type specimens of this species and of *P. granulosa* are interchanged; "*Pyrus* (c)" belongs to *P. granulosa* and "*P. variolosa* Trell. [sic] var." belongs to *P. verruculosa*.

Pyrus Kumaoni Decaisne, *Jard. Fruit.* I. 328, sub t. 7 (1872).—Hooker f., *Fl. Brit. Ind.* II. 374 (1879).—Schneider, *Ill. Handb. Laubholz.* I. 665 (1906).

Pyrus Wilhelmii Schneider, *Ill. Handb. Laubholz.* I. 665, fig. 363 n (1906); in Fedde, *Rep. Nov. Spec.* III. 120 (1907).

YUNNAN: Mengtze, mountain woods, alt. 1600 m., *A. Henry* (No. 10035a, type); same locality, alt. 1400 m., *A. Henry* (No. 10035b).
HIMALAYAS: Kashmir to Kumaon (ex Hooker).

This variety differs from the type in its glabrous or nearly glabrous inflorescence and leaves and in the ovate, broader and often obtuse calyx-lobes. I am unable to separate *P. Wilhelmii* specifically from this variety; broadly ovate leaves occur also in *P. pashia* and the statement that *P. Wilhelmii* has only 3 styles is not borne out by the specimen which represents Henry's No. 10035a, on which *P. Wilhelmii* is based, in the herbarium of the Arboretum, as the number of styles varies in that specimen from 3 to 5.

Besides *P. pashia* there occurs in the western Himalayas another closely related species, *P. Jacquemontii* Decaisne (*Jard. Fruit.* I. t. 8. 1872). This according to Decaisne differs from *P. pashia* in its smooth, not verruculose, young fruits. It is so far very imperfectly known, as neither the flowers nor the mature fruits have been described.

ARNOLD ARBORETUM,
Harvard University.

INDEX.

(The pages upon which the names are merely mentioned or occur as synonyms are indicated by italic numbers.)

- | | |
|---------------------------------|------------------------------------|
| Pyrus betulaefolia, 227, 236. | Pyrus pashia, 226, 227, 238. |
| Bretschneideri, 226, 231. | kumaoni, 239. |
| Calleryana, 226, 227, 237, 238. | phaeocarpa, 227, 235. |
| dimorphophylla, 238. | globosa, 236. |
| chinensis, 228. | serotina, 227, 231. |
| communis, 227, 233. | culta, 233. |
| hiemalis, 233. | Stapfiana, 233. |
| sinensis, 233. | serrulata, 227, 234. |
| dimorphophylla, 238. | Sieboldii, 233, 234. |
| Fauriei 226, 238. | Simonii, 225, 227, 228. |
| heterophylla, 239. | sinensis, 225, 227, 228, 230, 233. |
| Jacquemontiana, 226, 240. | culta, 233. |
| japonica, 233. | silvestris, 228. |
| Kawakamii, 238. | ussuriensis, 228. |
| Koehnei, 226, 227, 238. | ussuriensis, 226, 227, 235. |
| kolupana, 227, 238. | variolosa, 238. |
| kumaoni, 239. | verruculosa, 239. |
| Lindleyi, 226, 230. | Wilhelmii, 239. |
| nepalensis, 239. | Uyematsuana, 226, 235. |
| ovoidea, 226, 228. | |